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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/945,397	08/30/2001	Gurtej Singh Sandhu	303.541US2	4205

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EXAMINER

COTHORN, JUDITH A

ART UNIT PAPER NUMBER

2822

DATE MAILED: 10/07/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/945,397

Applicant(s)

SANDHU ET AL.

Examiner

Judith A. Cothorn

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 10-35 and 109-124 is/are pending in the application.
- 4a) Of the above claim(s) 23-35 and 117-124 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 10, 15-20, 22 and 109-116 is/are rejected.
- 7) ☒ Claim(s) 11-14 and 21 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Applicant's election without traverse of Group I, claims 10-22 and 109-116 in Paper No. 5 are acknowledged.

Claims 23-35 and 117-124 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in Paper No. 5.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 10, 15, 16, 17, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable by Figura et al. (6,255,687) in view of Dennison et al. (5,888,877) and Chen (6,077,743).

Figura et al. disclose a method comprising the steps of: forming an insulating layer (16) of borophosphosilicate glass on a substrate (column 5, lines 60-66); forming an opening having a bottom and sidewalls in the insulating layer (fig. 1; column 6, lines 8-21); forming a conductive layer of conductively-doped hemispherical grain polysilicon in the opening (fig. 2; column 6, lines 47-56); forming a fill layer of photoresist on the conductive layer, wherein the fill layer fills the opening (fig. 3; column 7, lines 4-15); removing the fill layer to expose an inside of the

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container structure (column 7, lines 13-15); and removing a portion of the insulating layer to expose an outside of the container structure (column 8, lines 62-67).

Figura et al. fail to disclose the steps of removing the conductive and fill layer to a level below a top of the insulating layer thereby forming a container structure and the formation of a dielectric cap on a top of the sidewalls.

Dennison et al. disclose the step of removing the conductive and fill layer to a level below a top of the insulating layer thereby forming a container structure (figs. 6-8).

Chen discloses the step of forming a dielectric cap on a top of the sidewalls of the conductive layer (figure 5; column 7, lines 30-36).

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Figura et al. to remove the conductive and fill layer to a level below the top of the insulating layer in order to isolate a rim of the conductive layer. Additionally, it would have been obvious to modify the method of Figura et al. to form a dielectric cap on a top of the sidewalls of the conductive layer as taught by Chen in order to form an etch mask. The claim language 'comprising' is open-ended and does not preclude the inclusion of additional processing steps. Whereas the claim requires those processing steps recited, additional processing steps maybe included, for example, the removal of the dielectric cap. See MPEP 2111.03.

Claims 18, 19, 22, and 109-116 are rejected under 35 U.S.C. 103(a) as being unpatentable over Figura et al. (6,255,687) as applied to claims 10 and 20 above, and further in view of Abernathey et al. (4,725,560).

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Figura et al., as modified, fail to disclose the dielectric cap on a top of the sidewalls of the conductive layer further comprising silicon oxynitride or the step of annealing the dielectric cap.

Abernathy et al. disclose the use of silicon oxynitride as the dielectric cap instead of silicon oxide and the step of annealing the dielectric cap.

Therefore it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the method of Figura et al. to use silicon oxynitride for the dielectric cap and anneal the dielectric cap because silicon oxide and silicon oxynitride are widely used dielectric films. It also would have been obvious to anneal the dielectric cap in order to drive out impurities in the dielectric film.

Allowable Subject Matter

Claims 11-14 and 21 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The additional cited art discloses a method for forming a cylindrical shaped capacitor.

Dennison (5,340,763) discloses method to form a multi-pin stacked capacitor utilizing micro villus patterning in a container cell.

Green (5,940,713) discloses a method for constructing a multiple container capacitor.

Dennison et al. (5,494,841) disclose a method for forming a stacked container capacitor using doped hemispherical grain silicon.

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Wu (5,650,351) discloses a method to form a multi-pillar capacitor using a cap layer, which is later removed, as a hard mask on the top of the capacitor sidewalls.

Popp et al. (4,783,309) disclose a double container system that has a closed bottom and sidewalls extending upward from the bottom.

Havens et al. (4,848,566) disclose a conductive container that has a closed bottom and sidewalls extending upward from the bottom.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Judith A. Cothorn whose telephone number is 703-305-4733.

The examiner can normally be reached on Mon-Fri, 8am - 5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 703-308-4940. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

jac
October 1, 2002


CARL WHITEHEAD, JR.
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800